ASSOCIATION BETWEEN BODY HEIGHT AND DOUBLE J STENT INTRAVESICAL POSITION AND ITS RELATION WITH THE INDONESIAN VERSION OF URETERAL STENT SYMPTOM QUESTIONNAIRE (USSQ)

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ABSTRACT

Objective: *This study aims to determine the relationship between the patient's body height with the intravesical double J stent position and whether its position is related to the ureteral stent symptom questionnaire (USSQ).* ***Material & Methods:*** *A cohort study with a study population of patients inserted with double J stent size 4.7 Fr and length 26 cm was carried out at the Department of Urology Hasan Sadikin Academic Medical Center from July 2021 to July 2022. We assess the patient's demographic features and different body heights into two categories, below and above average. Then we evaluate its stent position using a plain abdominal X-ray and the USSQ score.* ***Results:*** *Ninety samples were included in this study; 30 of them had a midline intravesical double J stent position, 30 pieces of contralateral, and 30 samples of ipsilateral. Only body height correlated to the stent's position ($p<0.05$). The results of comparative statistical tests or the association of postoperative complications between 7 days and 30 days in the position of the double J stent midline, contralateral and ipsilateral had significant results ($p<0.05$). Stent with ipsilateral position showed a lower USSQ score.* ***Conclusion:*** *Men and women above the average height have a lower risk for migration stent to the contralateral side and are also associated with lower USSQ scores.*

Keywords: *Double J stent, USSQ score, double J stent position.*

ABSTRAK

Tujuan: *Penelitian ini bertujuan untuk mengetahui hubungan antara tinggi badan pasien dengan posisi stent double J intravesical dan apakah posisinya berhubungan dengan the ureteral stent symptom questionnaire (USSQ).* ***Bahan & Cara:*** *Sebuah penelitian kohort dengan populasi pasien yang dipasangi stent J ganda ukuran 4.7 Fr dan panjang 26 cm dilakukan di Departemen Urologi Hasan Sadikin Academic Medical Center dari Juli 2021 hingga Juli 2022. Kami menilai demografi pasien dan tinggi tubuh menjadi dua kategori, di bawah dan di atas rata-rata. Kemudian kami mengevaluasi posisi stentnya menggunakan rontgen perut polos dan skor USSQ.* ***Hasil:*** *Sembilan puluh sampel dimasukkan dalam penelitian ini; 30 diantaranya memiliki posisi stent double J intravesical midline, 30 buah kontralateral, dan 30 sampel ipsilateral. Hanya tinggi badan yang berkorelasi dengan posisi stent ($p<0.05$). Hasil uji statistik komparatif atau hubungan komplikasi pasca operasi antara 7 hari dan 30 hari pada posisi pemasangan double J stent midline, kontralateral dan ipsilateral memberikan hasil yang bermakna ($p<0.05$). Stent dengan posisi ipsilateral menunjukkan skor USSQ yang lebih rendah.* ***Simpulan:*** *Pria dan wanita di atas tinggi rata- rata memiliki risiko migrasi stent yang lebih rendah ke sisi kontralateral dan juga terkait dengan skor USSQ yang lebih rendah.*

Kata kunci: *Stent J ganda, skor USSQ, posisi stent J ganda.*

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INTRODUCTION

Double J stents have been used for more than 25 years and have become one of the important tools of the endoscopic armamentarium in the field of urology. Double J stents are mainly used for stabilization of the ureter after surgery and for drainage through an obstructed, leaking, dysfunctional, or stenotic ureter.[1] Insertion of double J stents still has a high rate of postoperative complications. Complications that are often found include frequency (60%), urgency (60%), painful urination (40%), low back pain (80%), hematuria (54%), and UTI (11-18%).[2] Joshi et al. found that 80% of patients reported interference with daily activities due to irritating symptoms after a

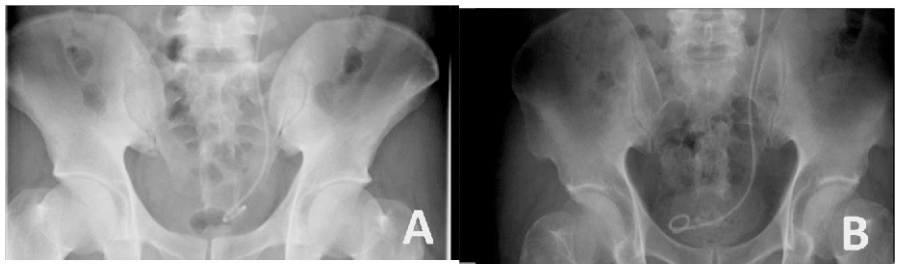

Fig. 1 Classification of the intravesical ureteral stent position. (A) The intravesical ureteral stent in the not crossing group does not cross the midline of the bladder; (B) the stent crosses the midline in the crossing group.[15]

double J stent.[3-4] Therefore, the symptoms associated with the installation of double J stents are considered to impact the patient's quality of life.[3]

Ideally, a double J stent should be placed according to the length of the patient's ureter. Various studies have been conducted to predict the length of the patient's ureter, one of which is based on height. However, several studies have not shown consistent results regarding assessing height as a predictor of ureteral length and its relationship with stent intravesical.[5] In Indonesia, no research assesses the relationship between average height and double J stent intravesical.

Findings regarding the possible effect of double J stents on postoperative complications in patients with double J stents are inconsistent. Abt et al. and Giannarini et al. investigated predictors of postoperative complications in patients with double J stents and identified the location loop across the midline of the pelvis as a risk factor for urinary symptoms and pain, impaired general health, work performance, and sexual problems. Differences in patient characteristics in Indonesia and western countries can produce different results for postoperative complications in patients with double J stents.[4-5]

Temporary drainage of the upper urinary tract with a double J stent is a routine procedure in the management of ureteral obstruction.[6] Research by Tansol et al. in 2019 has validated the USSQ in Indonesia.[7] Findings regarding the possible effect of double J stent on postoperative complications in patients with double J stent have not shown satisfactory results, even though the distal end of the double J stent a variable that can be easily adjusted so that it can be studied further.[8] In addition, the part of the double J stent is affected by the user's ureteral length.[9] Height is used to predict ureteral length, although several studies have yet to show consistent results in assessing the relationship

OBJECTIVE

This study aims to determine the relationship between the patient's body height with the intravesical double J stent position and whether its position is related to the ureteral stent symptom questionnaire (USSQ).

MATERIAL & METHODS

This study used a prospective cohort study design with a study population of patients with a double J stent measuring 4.7 Fr and 26 cm long whose installation procedure was carried out at the Department of Urology at Hasan Sadikin General Hospital from July 2021 to July 2022. The inclusion criteria in this study were patients aged 15 to 64 years, underwent unilateral ureterorenoscopy, had double J stents installed stents with a size of 4.7 Fr and a length of 26 cm, willing to be included in this study, can speak Indonesian, and eager to follow up on days 7 and 30.

Exclusion criteria in this study were a history of abnormalities in the lower urinary tract, such as chronic bacterial prostatitis, chronic pelvic pain syndrome, bladder cancer, and prostate cancer (for men); a history of incontinence, lower urinary tract disorders, and pregnant patients (for women). History of ureteral obstruction due to cancer in the pelvic organs, bleeding, recurrent urinary tract infections, overactive bladder syndrome, and neurological or psychiatric disorders. History of using alpha-blocker drugs, anticholinergic, anti-pain, and other drugs that can cause lower urinary tract function disorders. History of uretero-renoscopy with complications requiring ureteral reimplantation. To improve data accuracy, the

number of samples to be collected is 90 (minimum of 30 patients per group divided based on the position of the double J intravesical stent).

The study was conducted using the USSQ questionnaire translated and validated into Indonesian to assess postoperative complications related to the quality of life in patients and plain X-rays of the abdomen to assess the position of the double J stent 7 days after the double J stent. Then all patients included in the study will be evaluated by asking patients to fill out the USSQ questionnaire on the 30th postoperative day. The numerical data is evaluated by a normality test using the Kolmogorov Smirnov. A significance test to compare the numerical characteristics of the data from the two treatment groups used the paired T-test.

The test of significance to compare the characteristics of the descriptive categorical data of the two treatment groups used the Chi-square test. The data obtained are recorded in a special form and then processed through the SPSS version 24.0 for Windows. This research has received Ethical Clearance (EC) from the Research Ethics Commission of Padjadjaran University. The number of Ethical Clearance is 1152/UN6.KEP/EC/2022.

RESULTS

The study sample was a patient with a double J stent whose installation procedure was carried out at the Department of Urology, Hasan Sadikin General Hospital, from July 2021 to July 2022. Total samples with double J intravesical stents at Hasan Sadikin General Hospital aged 15 to 64 years, as many as 90 patients. None of the patients had a history of complicated ureterorenoscopy. All 90 patients underwent a USSQ questionnaire examination on the 7th and 30th day after the stent and underwent a plain X-ray examination of the abdomen on the 7th postoperative day.

The position of the Double J Intravesical Stent of 90 samples, 30, or 33.3%, had a Double J Stent intravesical Midline, 30 Contralateral, or 33.3% and Ipsilateral 30, or 33.3%. In the age variable, there was no significant difference between the groups with the highest median age in the Midline is 50. Of the three groups, there were more males than females, but no statistically significant difference was found. From the distribution of BMI, 61 people, or 67.8%, belonged to the non-obese group, and 29 people, or 32.2%, including the obese group. Of the three groups, there were more non-obese than obese, but no statistically significant difference was found. There is no significant difference in the work variable between the three groups with the largest number of workers. There was also no significant difference on the variable side of stent placement between the three groups, with the right side being more in the ipsilateral group and the left side being more in the midline.

Table 1. Description of the position of the double J intravesical stent.

Variable	N=90
Position of the Double J Intravesical Stent	
Midline	30(33.3%)
Cotralateral	30(33.3%)
Ipsilateral	30(33.3%)

Note: For data categories, data is presented by number/frequency and percentage, datais presented by mean, median, standart deviation and range

Based on the height variable for the female and male sex, it was found that overall the results showed a significant effect on the position of the double j intravesical stent (P value <0.05). In the 7th-day group, the subscores of urinary tract symptoms, general health, pain, job performance, additional problems, and USSQ total scores were the highest in the contralateral group, with significant results in all groups (P<0.05). In the sexual problems subscore group, the highest average score was in the Midline with insignificant results (P value> 0.05). In the 30th-day group, the subscores of urinary tract symptoms, general health, pain, job performance, additional problems, and USSQ total scores were the highest in the contralateral group, with significant results in all groups (P value <0.05). In the sexual problems subscore group, the highest average score was in the Midline with insignificant results (P value> 0.05).

The results of comparative statistical tests or the association of postoperative complications between 7 days and 30 days in the double j stent midline had significant results p (<0.05) on the subscore variables of urinary tract symptoms, body pain, general health, job performance, and total USSQ score. Meanwhile, the subscore variable for sexual and additional problems had insignificant results (P value> 0.05).

The results of comparative statistical tests or the association of postoperative complications between 7 days and 30 days in the double J stent position had a significant consequence of p (<0.05) on the variable subscores of urinary tract symptoms, body pain, additional problems, work performance, and total USSQ score. At the same time, the subscore

variables for sexual issues and general health had insignificant results (P value> 0.05).

The results of comparative statistical tests or the association of postoperative complications of patients 30 days in the double J stent had significant results p (<0.05) on the subscore variables of urinary tract symptoms, work performance, additional problems, and total USSQ score. While the subscore variables for body pain, sexual issues, and general health had insignificant results (P value> 0.05).

Table 2. Comparison or relationship of characteristic with the position of the double J intravesical stent.

Variable	*Midline* N=30	Contralateral Group N=30	Ipsilateral N=30	Total N=90	P Score
Age					**0.308***
Median	51.50	50.00	47.00	50.00	
Range (min-max)	28.00- 63.00	36.00-64.00	26.00-64.00	20.00 - 64.00	
Sex					**0.131**
Male	16(53.3%)	23(76.7%)	17(56.7%)	56(62.2%)	
Female	14(46.7%)	7(23.3%)	13(43.3%)	34(37.8%)	
BMI					**0.241**
Obese	13(43.3%)	9(30.0%)	7(23.3%)	29(32.2%)	
Non-obese	17(56.7%)	21(70.0%)	23(76.7%)	61(67.8%)	
Body Height Female					**0,013****
<154 cm	9 (30%)	7 (23.4%)	4 (13.3%)	20 (22.2%)	
≥154 cm	2 (6.7%)	3 (10.0%)	9 (30%)	14 (15.6%)	
Body Height Male					**0,036****
<166 cm	16 (53.3%)	7 (23.4%)	5 (16.7%)	26(28.9%)	
≥ 166 cm	7 (23.3%)	9 (30.0%)	12 (40.0%)	30(33.3%)	
Studets	1(3.3%)	0(0.0%)	0(0.0%)	1 (1.1%)	
Workers	22(73.3%)	28(93.3%)	27(90.0%)	77 (85.6%)	
Non-Workers	7(23.3%)	2(6.7%)	3(10.0%)	12 (13.3%)	
					0.183
Double J Stent Insertion side					
Right	9(30.0%)	12(40.0%)	16(53.3%)	37 (41.1%)	
Left	21(70.0%)	18(60.0%)	14(46.7%)	53 (58.9%)	

Note: *The p value was tested using the alternative Kruskal Wallis test because the data is not normally distributed. The significance value is based on p value <0.05.
The p value is calculated based on the Chi-Square test. The significance value is based on the p value <0.05.

Table 3. Comparison of USSQ examination results on the 7th and 30th day post-operation with the double J stent intravesical position.

Variable	*Midline*			Contralateral			Ipsilateral		
	7th day N=30	30th day N=30	Nilai P	7th day N=30	30th day N=30	Nilai P	7th day N=30	30th day N=30	Nilai P
Subscore Urinary symptoms			**0.0001****			**0.0001****			**0.0001****
Median	23.50	20.00		27.50	24.00		18.50	16.00	
Range (min-max)	18.00-37.00	13.00-31.00		19.00-41.00	16.00-38.00		13.00-33.00	12.00-33.00	
Subscore Body Discomfort or Pain			**0.0001****			**0.001***			**1.000**
Median	13.50	12.50		18.00	16.50		12.00	12.00	
Range (min-max)	2.00-22.00	2.00-21.00		2.00-30.00	2.00-3.00		2.00-19.00	2.00-19.00	
Subscore Health Status			**0.001****			**0.082**			**0.742**
Median	12.50	10.00		14.00	13.00		11.50	11.00	
Range (min-max)	6.00-18.00	6.00-21.00		6.00-25.00	7.00-21.00		6.00-19.00	6.00-19.00	
Subscore Work Performance			**0.0001****			**0.0001****			**0.0001****
Median	12.50	10.50		14.00	13.00		15.00	12.00	
Range (min-max)	5.00-19.00	5.00-17.00		7.00-31.00	7.00-25.00		10.00-33.00	9.00-20.00	
Subscore Sexual Problem			**1.000**			**1.000**			**1.000**
Median	5.50	5.50		2.00	2.00		2.00	2.00	
Range (min-max)	1.00-12.00	1.00-12.00		1.00-12.00	1.00-12.00		1.00-12.00	1.00-12.00	

DISCUSSION

The median age of the entire study population was 50 years (20 - 64 years). The proportion of male sex in this study was 56 (62.2%).

This study's population was all patients with double J stents intravesical. The indication for placing a double J stent is as a component (adjunct) in ureteral surgical procedures and to treat ureteral obstruction.

According to the World Population Review, in 2022, the average height of male Indonesians is 166.26 cm, and the height of female Indonesians is 154.36 cm. Based on the results of cross-tabulation between height and stent in both sexes, it shows that in patients with below average height, the stent tends to be on the contralateral side, while in patients with above average height, the stent is on the ipsilateral by using the same size double J stent. Research conducted by Ho et al., for a height <175 cm, it is recommended to use a stent with a length of 22 cm, while for a height > 175 cm, it is recommended to use a stent of 24 or 26 cm. This follows our study, where the length of the stent is the user's height. Until now, the relationship between height and stent was the first time it has been studied in Indonesia, so it cannot be compared with other studies.[13-14]

This study's median total USSQ scores were 78.00 at seven days and 69.00 at 30 days postoperatively. This figure agrees with a previous study by Abt et al. (median total USSQ score 77.5) using Percuflex ureteral stents (Boston Scientific, Natick, MA, USA) 6 French diameter, 26-30 cm long.[15] In this study, the stent used was a stent with a diameter of 4.7 French and a length of 26 cm. In this study, there was an improvement in the quality of life in patients from 7 days to 30 days postoperatively, as seen by a decrease in the USSQ score. This finding agrees with Giannarini et al., which also found a statistically significant decrease in all USSQ subscore domains except the sexual problems domain.[5] In this study, when viewed based on the average, a reduction in USSQ scores was found in all subscore domains except the job performance domain. Still, it is unknown whether the decrease is statistically significant because the statistical analysis was not conducted to assess its significance. Nonetheless, it can be concluded that the symptoms caused by the double J stent will decrease over time.[13]

In this study, the USSQ assessment at seven days showed that the double J stent scored the highest and was statistically significant in all 6 USSQ subscore domains. However, it is not statistically significant in 1 part of the USSQ subscore (sexual issues). In contrast, the double J stents on the ipsilateral had the lowest score of the other two positions. Double J stents were associated with the median total USSQ score at seven days postoperatively (ipsilateral = 72.00, contralateral = 85.00, midline = 74.50; p<0.0001). At 30 days postoperatively, the double J stents showed a significant association across all USSQ subscore domains except the sexual problems subscore. This indicates that the larger the intravesical stent portion, the greater the effect on decreasing the patient's quality of life.

A previous study by Abt et al. involved 73 patients with double J stents placed in 3 double J stents differently in intravesical. The study demonstrated that stents had lower total USSQ scores at 30 days postoperatively (median ipsilateral 69.0; median midline 86.5; median contralateral 77.0), but these rates were not statistically significant. Analysis of the 6 USSQ sub-scores also did not show significant results.[4] A 2010 study by Giannarini assessed the quality of life of 86 patients with double J stents. On day 7, double J stents were significantly associated with all 6 USSQ subscore domains. In contrast, other variables such as gender, BMI, and stent were only significantly associated with 1 USSQ subscore domain. On day 30 of the double J stents remained significantly associated with 6 USSQ domains, whereas with other variables, only BMI was significantly associated with only 1 USSQ domain. The study shows that the double J stents have a greater influence than other variables on the patient's quality of life.[5]

Another study by Inn et al. in 2019 also found results that match this study. Of a total of 46 patients, statistical analysis showed that the double J stents were associated with lower USSQ scores. The study also mentions that the domain of urinary tract symptoms is the most affected domain due to differences in the position of the double J stents.[13] A study by Mehra et al. in 2020 evaluated the quality of life of 157 patients who had double J stents after endoscopic lithotripsy related to the intravesical double J stent.

The study found that the double J stent causes more pain than the double J stent (p=0.01).[14] A study by Ho et al. in 59 patients also found that a stent position that crossed the midline was significantly associated with urge incontinence and bladder pain.[10] A multicenter study by Lingeman et al. in 236 patients, comparing patients' USSQ scores, found that longer distal loop stents were associated with worse USSQ scores.[14] Whereas another study by Taguchi et al. in 2022 found that stents that exceeded the midline caused worse symptoms, as seen from a worse overactive bladder symptom score (OABSS) score (p=0.032).[16-17]

Various studies, including this study, have proven that double J stents that exceed the midline cause worse symptoms and affect the patient's

quality of life. Irritation of the bladder mucosa and especially the trigone distal to the stent, reflux of urine, and smooth muscle spasm are thought to contribute to stent-related symptoms. Colic back pain is believed to occur due to urine reflux through the stent during urination. Intravesical pressure increases when the detrusor muscle contracts, causing back pressure to the pelvicalyceal system of the kidney and causing pain. As a result of activity and contraction of the detrusor muscle, stent movement occurs in the kidney, ureter, and bladder.

Studies say the stent can move as much as 2.5 cm per day if the patient is active. This movement is also thought to contribute to pain and urinary tract symptoms due to irritation of the bladder mucosa. Frequency and urgency may result from mechanical stimulation of the bladder mucosa by the loop distal. This mechanism is further supported by the finding that patients report milder symptoms at night because, at night, patients reduce their activity.[17]

In this study, there was no statistically significant mean difference between the BMI variables in the midline, contralateral and ipsilateral groups. This is similar to the results of univariate and multivariate analysis by Taguchi et al. and Fischer et al., which evaluated the correlation between ureteral stent position and patient parameters, where there was no correlation between stent position and BMI.[15-16]

This study's findings follow previous studies that prove that the position stents are related to the patient's quality of life. The position of the double J stent is variable and can be easily adjusted. Knowing this relationship can become the basis for determining the placement of the double J stents so that they can have a good impact on the patient's quality of life.

The limitations of this study are that we did not analyze other variables that might be related to USSQ scores, so multivariate analysis was also not carried out in this study. Nonetheless, we have conducted a literature search and excluded patients with certain comorbidities that might have confounded the results of this study.[9] Subjects over the age of 50 are prone to have LUTS symptoms.[18-19] We conducted anamnesis first to rule out possible LUTS symptoms in patients before surgery. However, we administered antibiotics for seven days to our study patients to rule out bias. Lastly, this study did not assess the quality of life of post- stents. Although stent-related symptoms are widely known, comparing patients' quality of life before and after stent placement can provide a stronger picture of a causal relationship.

CONCLUSION

There is a relationship between the height and position of the double J intravesical stent and the assessment of the stent in the Department of Urology, Hasan Sadikin General Hospital, based on the Indonesian version of the USSQ questionnaire. The double J stent had a lower total USSQ score. Men and women below the average height have a greater risk of the stent to the contralateral side with the use of a double J stent 26 cm long The symptoms of the stent on the 7th and 30th day, were considered to have improved, marked by a decrease in the total USSQ score.

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